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by

Thomas G. Beynon

Reprinted from Journal of the Town Planning Institute
52(8):319-322, London, 1966

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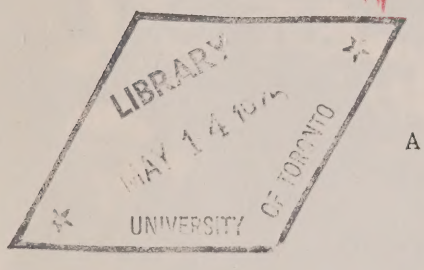

A METHOD OF FORECASTING LOCAL EMPLOYMENT

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A method of forecasting local employment

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Scope and purpose

The intention of this paper is to describe in outline a method of projecting the employment structure of sub-regions and larger local authority areas. The purpose of the paper is to provide local planning departments with a viable alternative to the minimum solution of a linear extrapolation of past trends and the maximum solution of purchasing the expertise of an outside consultant.

It may be asked 'why bother to risk projecting at all—for it is always a risky business?' The short answer is that the planner, for better or for worse, must always be engaged in projecting. The existing environment, after all, is the result of planning decisions made not today but several years ago. Similarly, it will be some time before today's decisions are clearly visible on the ground. It is thus quite clear that the planner has to ask himself such questions as how many people will be living within his jurisdiction at selected dates in the future; what will be the age structure of the population; how will income levels change; what will be the additional need for shopping facilities; how many jobs will there be, and of what kind? Of course, he will make mistakes, yet it is likely that a plan developed after some thought has been given to the future will be superior to one based only on the exigencies of the moment.

Selection of the study area

If the planner is to forecast employment, his first step is to select the area within which to make his forecasts. This 'study area' will rarely if ever coincide with the boundaries of the local authority for which the planner is responsible. This occurs because, first, employment statistics are tabulated locally on the basis of Ministry of Labour employment exchange areas, and secondly, and perhaps more importantly, local authority boundaries are somewhat arbitrary and have only infrequently been drawn so as to incorporate a viable economic entity.

There is usually a great deal of commutation to and from work across local borders and the first thing that the planner therefore has to do is determine the labour market area into which his jurisdiction fits. The problem of defining the community labour market can perhaps best be phrased in the indifference curve language of the economist as an area within which a particular group of workers are indifferent about the location of their employment. Thus if a firm moved its operations within this area it would retain its existing labour force, whereas if it moved anywhere outside it would largely have to recruit a new complement of employees.

How then does one discover this area of indifference? There is no method that permits complete precision. In some instances a planner will know his territory so well that he can outline the boundaries intuitively. For those who cannot do this, resort should perhaps be made to the journey-to-work analysis in the 1961 census.[1] County Borough planners should study their community as a place of work and a place of residence. People will come from surrounding places to work in the borough and, likewise, a certain portion of the borough residents will travel to work in neighbouring communities. The planner should select all those communities that provide more than a certain percentage of the employment in the borough—say 5 per cent. To these he should add those communities (if different) that receive more than 5 per cent of the workers resident in the borough. County planners studying a section of their county should select the dominant urban district (or districts) in the area and execute a similar analysis.

We now have an estimate of the geographical extent of the local labour market. This has next to be modified to take account of the availability of employment statistics. Estimates of the amount of employment in local areas are made by the Ministry of Labour[2] annually and tabulated for the various employment exchange areas. The planner should thus select the employment exchange area (or areas) that most closely coincides with the labour market which he has already outlined. The area thus selected becomes the study area.

Collection of background statistics

The planner should next ask the Ministry of Labour to supply him with employment statistics for the past ten years or preferably longer. Since the method of classifying the different types of employment was altered slightly in 1958, he should also ask the Ministry for particulars of how to convert the pre-1958 data in order to achieve a consistent time series.

At this stage the planner requires population statistics for his study area. This is now likely to include several full local authority areas and certain portions of other local authority areas—the portions resulting from the adjustment to Ministry of Labour units. From the Registrar General he should acquire details of the annual population change in the study area over the same period for which he has the employment data and also for the future period over which he wishes to project employment.[3] Since the Registrar General does not provide estimates for portions of local authority areas, he will sometimes have to revise the estimates somewhat in order to derive population figures for the study area.

The framework for forecasting

The stage is now set for the projection analysis. The first step is to develop an estimate of the total volume of employment that will be needed if the study area is to achieve 'economic balance'—i.e., a position in which there is neither a *net* import nor a *net* export of jobs. These figures can be derived for 1971 and 1981 by reference to the regional employee activity rates calculated by the Ministry of Labour.[4] If the age-sex structure of the study area population conforms closely with that of the region in which it is located,[5] the appropriate Ministry of Labour regional activity rate forecast can be applied to the projected population for 1971 and 1981 in order to derive the likely future employment.[6]

The classification of local employment

The next step is to divide the study area employment into two categories—locally dependent and independent. The locally dependent category includes all that employment which is concerned with the production of goods or services for the local population. *Ceteris paribus*, locally dependent employment will rise or fall in response to movements in a similar direction in local population and purchasing power. The independent category covers all that employment which produces for the national and overseas market. The size of the local population has only an indirect effect on independent employment—e.g., it has some influence on local locational factors and hence on local attractiveness to industry.

There are several methods of dividing employment into the two categories. They range from the objective statistical calculation to the subjective intuition of the individual responsible for the project. The objective methods include the macrocosmic technique,[7] and the minimum list technique,[8] in which the structure of employment in the study area is compared with the national structure or with the structure in selected comparable urban units. Another method is to interview selected local firms in each category and to ask them what proportion of their sales goes to the local market as opposed to the outside or 'export' market. Those categories in which there is a high proportion of local sales can then be considered as locally dependent, and conversely, those with a low proportion are independent.

If neither the statistical nor interview technique is used, it is reasonably satisfactory to resort to an intuitive division of employment. The person in charge of the study will then merely run through each classification of employment[9] and decide into which category it should go. Since he should have a reasonably good idea of the major firms and their activities, this should not be a difficult task. A typical work sheet might resemble that in table 1. The following points should be noted:

1 Some classifications include elements of both categories. Although they are then placed in the category into which the bulk of their employment falls, the minority elements cannot be forgotten. Thus public administration and defence will be projected as a locally dependent category net of the defence installation. The future of the defence installation will then be assessed independently and added back in order to complete the projection.

2 Certain classifications may have no independent employment at present but could acquire some over the projection period. The first manufacturing classification in the hypothetical work sheet could, for example, ultimately include a tobacco plant. Accordingly, all categories presently without independent employment should be reviewed carefully as potential sources of such employment.

3 Some classifications, such as engineering, might at first glance appear to be locally dependent, but if, as is the case in our example, they manufacture components for local companies who themselves are independent, they should, because of this linkage, be likewise classified.

Table 1. Hypothetical work sheet for categorizing employment

Category of Employment	*Comments*	*Locally Dependent*	*Independent*
Primary	Limited agriculture—coalmining		X
Manufacturing			
Food, Drink, Tobacco	No drink or tobacco, bakery with service area radius 5 miles	X	
Chemicals & Allied	Soap factory		X
Metal Manufacture	Steel plant		X
Engineering and Electrical	Component producers for national manufacturers		X
Shipbuilding	Nominal		
Vehicles	British Railways workshop		X
Other Metal Goods	Nominal		
Textiles	Nominal		
Apparel	Men's suit manufacturer		X
Building Materials, Furniture	Brick and cement firms—regional market		X
Paper, Printing	Local newspaper	X	
Other Manufacturing	Nominal		
Services			
Construction	Local houses, factories, shops and repairs	X	
Utilities	Municipal services	X	
Transport and Communications	Local public transport	X	
Distribution	*Net out regional wholesaling*	X	
Insurance, Banking Finance	No regional or national	X	
Professional and Scientific Services	*Net out large national research laboratory*	X	
Public Administration, Defence	*Net out Ministry of Defence Installation*	X	
Miscellaneous Services	Cinemas, catering, personal services	X	

The projection of locally dependent employment

With the locally dependent employment categories isolated, the next step is to relate the employment to the local population. This can be done most conveniently as follows:

$$\frac{\text{Locally dependent employment}}{\text{Study area population}} \times 1{,}000$$

The preceding formula provides employment per thousand of local population, and this ratio should be calculated for all locally dependent categories for each of the last 10 or 15 years. The end result will be a time series similar to the following:

Table 2. Employment per thousand of population in the study area, 1954–1964

Year	*Locally dependent category*			
	Construction	*Utilities*	*Transport*	*Distribution*
1954	27	8	34	50
1955	28	8	34	51
1956	28	8	34	52
1957	28	8	34	53
1958	28	7	33	53
1959	28	7	32	54
1960	29	7	32	55
1961	30	7	33	55
1962	30	7	33	56
1963	31	8	32	56
1964	32	8	32	56

A similar table should be prepared showing national ratios for the same categories.

The planner should now project the local ratios over the horizon required—say five or ten years (i.e., to 1970/75). This can be done in a sophisticated fashion using regression techniques, or more simply by plotting the data on graph paper and drawing a smooth curve which can be extended over the planning period. The best method will depend on the amount of historical data available and the degree of precision required—as well, of course, as on the statistical expertise of the planner.

The projected employment ratios should be applied to the projected population in order to determine future levels of locally dependent employment. Before this is done, however, the local ratios should be compared carefully with the national statistics. If there is a fairly close agreement, the projection can be proceeded with; but any wide divergencies should be carefully investigated. There may, for example, be good reasons for the local ratio of insurance and banking to persist below the national average, but if the planner knows that a new office block will shortly be constructed to accommodate accountants, insurance firms and such, there may be good reason to raise the projected local ratios closer to the national average. Is is clear that many communities 'import' services from neighbouring communities, but there is no reason why they should always do so.

Special categories and primary employment

With locally dependent employment projected, it is now possible to add in those single-firm categories whose future can be gauged fairly accurately during a personal interview. Thus, in the hypothetical example given in Table 1, it would be possible to assess the future of the defence installation in discussion with the military authorities. Similar discussions with the appropriate authorities will indicate the future for the research laboratory.

We are left now with the primary sector and the independent manufacturing sector. The former can be disposed of more easily than the latter. For agricultural employment, the best source of information on the local area is likely to be the Divisional Office of the Ministry of Agriculture, Fisheries and Food. Also useful is the Census Section of the Ministry at Epsom Road in Guildford. For coal-mining, the planner should visit the regional office of the National Coal Board. From these and other sources, the likely trends in primary employment can be estimated with satisfactory accuracy.

The projection of independent employment

All that remains is to forecast independent employment. The total amount that is likely to be required can, of course, now be determined by subtracting the primary and locally dependent estimates from the total employment forecasts made earlier in the analysis. The planner thus has a reasonable idea of the amount of independent employment needed if the study area is to acquire a balance between population and employment—which need not, of course, necessarily be desired. His final task thus becomes one of determining the type of employment and the source from which it will come.

The planner should now engage in some inexpensive primary research. He should first acquire from the Ministry of Labour a copy of the employment register for each of the employment exchange areas in the study area. This document will show the names and addresses of all firms employing more than five persons in the area. The firms may be classified according to amount of employment and standard industrial classification, thus permitting the planner to list all firms in each of his independent categories. A random sample of firms in these categories can then be selected for personal interview; the sample can be weighted to give emphasis to the larger companies.

The planner should interview the firms regarding recent trends in their employment and the demand for their products. He should record their opinion of future trends in output and employment over a five-year and, if possible, ten-year horizon. He should also take the opportunity to ask the businessmen their opinions of the advantages and disadvantages of the area for manufacturing industry.[10]

The responses of all firms in particular categories regarding future demand for employees should be averaged and the results used to project independent employment over the period required. The growth in independent employment thus revealed may be termed endogenous growth, i.e., the growth attributable to existing industry. The total growth of independent employment will however come from two sources, endogenous and exogenous, i.e., the movement into the area of outside industry, either by transfer or by the opening of branches. The final problem thus becomes one of estimating the exogenous independent employment.

For this final stage the planner reverts to a desk exercise. The history of employment in each of the independent categories should be plotted on a graph. A smooth curve should then be drawn for each category and projected forward over the horizon required. The results of this exercise are future levels of independent employment (endogenous and exogenous) *if* the future rate of growth in each category is similar to the past. The projection includes exogenous employment growth since, as is obvious, previous exogenous growth is 'built-in' to the historic figures.

The independent employment projected on the basis of the interviews should be subtracted from the graphic projection and the residual will be the expected exogenous growth. However, there is one further refinement that might usefully be made. Strictly, there is no reason why the overall growth of certain categories should be the same as in the past. For this reason, the planner would do well to study the industry forecasts for the nation made by the Department of Economic Affairs[11] and the National Institute of Economic and Social Research.[12] The separate estimates of these two bodies may be averaged and the resultant annual growth rates to 1970 (or to 1975 if the National Plan estimates are extended) compared with the actual annual rates of increase in the last ten years. In those categories in which a marked increase or decrease over the past record is indicated, the planner may wish to revise the local projections accordingly, although a close perusal of the supporting text is advised, since the contributing national circumstances may not be operating at the local level. After all reasonable adjustments have been made, the planner can derive the exogenous growth by subtraction in the manner indicated earlier.

Summary of results

The exercise is now almost complete. The planner has developed the following estimates of future employment:

locally dependent employment by type;
primary employment by type;
independent endogenous employment by type;
independent exogenous employment by type;
total employment by type.

It should be noted that the total employment forecast may exceed or fall short of the 'economic balance' estimate made earlier. If the forecast exceeds the estimate, it is apparent that the study area will 'export' employment—i.e., it will draw workers from outside of the area.

If the forecast falls short of the economic balance estimate, the study area will 'import' employment—i.e., a portion of its residents will have to find work elsewhere. If this is the case, and it is desired to avoid such a situation, the analysis will have been most useful in drawing attention to the nature and extent of the deficiency. The planner who is responsible for an area that appears to have a deficiency problem can now make use of the answers of local businessmen regarding the advantages and disadvantages of the area for manufacturing. These responses should be collated and summarized into a table of 'locational factors'. This table should then be used to determine the type of industry that might be most easily attracted to the area.[13] If possible, this analysis should be supplemented by a review of industrial development certificates approved for the area in recent years. The latter review will indicate the type of industry that has been attracted to the area recently. The advantage of these exercises is that they will permit the concentration of industrial promotion efforts in those categories where success is most likely.

New and expanding towns

It will be noted that the entire analysis in this paper has been based on the supposition that the study area has an established history of economic activity. However, the analysis is not entirely irrelevant to new or expanding towns. In such cases, the estimates of locally dependent employment can be based on regional or national figures or even on established new towns of the size and type to which the town involved is expected to grow. The analysis of expanding towns should be based on a summary of the experience of existing towns similar in order of magnitude to the expanding community.

The process of estimating independent employment for new towns is, of course, much more difficult. Nevertheless, the researcher who develops a table of locational factors for the area in which the new town will be situated should be able to reduce the scope of the analysis to manageable proportions. Thereafter, it is likely once again that he would achieve the best results from a close examination of the industrial structure of similar extant new towns.

Relationship with economic base method

The methodology outlined in this paper is in some respects the antithesis of the economic base technique. The latter is widely used in the United States, and although it also relies on a division of employment into local dependent and independent, it regards the independent employment as basic to the success of the local economy. Researchers who use the economic base technique first project independent employment and later add in locally dependent employment by means of a multiplier factor. Sometimes they even go on to project population from the resultant employment forecast—a population-support analysis.

The economic base technique would appear to have greater validity in the United States than in the United Kingdom. There, the resources of government have still not been committed to the maintenance of full employment in the nation and all its constituent parts. In such a situation, with market forces still pre-eminent, there is much to be said for a theory which states that employment determines population. In the United Kingdom, however, the government has a fairly close control over the location of industry through investment incentives and industrial development certificates. Under these circumstances, industry can largely—there are, of course, exceptions—be directed to where it is needed. The analysis in this paper is based on the British framework. The methodology is comparatively simple, but it does not have general applicability, and can be used only for those economies in which the government accepts responsibility for the maintenance of full local employment.

References

1 1961 Census—Areas of residence and workplace in combination.
2 Employment Record II—Estimated numbers of insured employees in the area of the Employment Exchange at June of each year.
3 Requests for such information should be addressed to the Regional Demography Unit, General Register Office, Somerset House, London, WC2.
4 *Ministry of Labour Gazette*, September 1965, pp. 390–391.
5 Comparisons of the structures can be made by referring to the 1961 Census.
6 If the local population structure varies substantially from that of the region, adjustments can be made by reference to a further article in the *Ministry of Labour Gazette* for January 1965, page 2, which shows projected national working population activity rates in selected age-sex brackets.
7 Ralph W Pfouts, 'The Techniques of Urban Economic Analysis', Chandler Davis Publishing Co., p. 86.
8 Proceedings of the IGU Symposium in Urban Geography, Lund, 1962, p. 121.
9 Standard Industrial Classification, 1958. Central Statistical Office.
10 A useful prompt list of locational factors may be found in 'The Future Work-force of Canberra', National Capital Development Commission, 1960, pp. 36–39.
11 The National Plan. HMSO, September, 1965.
12 'The British Economy in 1975', W Beckerman and Associates. National Institute of Economic and Social Research, 1965.
13 A useful source for this analysis is 'Industry in Towns', G Logie. Allen and Unwin, 1952, p. 30.

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